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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/921,456	08/03/2001	Timothy J. Brosnihan	Analog.5683	7021
7590 08/04/2005				
Matthew E. Connors Samuels, Gauthier & Stevens LLP 225 Franklin Street, Suite 3300 Boston, MA 02110		EXAMINER HUYNH, YENNHU B		
		ART UNIT PAPER NUMBER		
		2813		

DATE MAILED: 08/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/921,456

Applicant(s)

BROSNIHHAN ET AL.

Examiner

Yennhu B. Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 23-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 7, 16 and 19-22 is/are rejected.
- 7) ☐ Claim(s) 4, 5, 8-15, 17 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/27/02, 08/03/01.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Applicant's election filed on 01/03/05.

Election/Restrictions

Applicant's election of claims 1-22 in the reply filed on 01/03/05 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 23-42 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected claims, there being no allowable generic or linking claim. Election was made without traverse in the reply filed on 01/03/05.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 02/27/02 and 08/03/01 is being considered by the examiner.

Oath/Declaration

Oath/Declaration filed on 08/03/01 is accepted.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3,6,7,16 & 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Brosnihan et al. (US. 6,121, 552).

Brosnihan et al. disclose a microfabricated high aspect ratio device, which includes:

-Re. claim 1: providing a substrate 16 comprising a handle layer of silicon 44 a device layer 48 of silicon, and a sacrificial layer or etch stop layer 46 that between the handler 20 and device 34, forming a micromechanical 14 in the device layer 48 (fig.4); removing a portion of the sacrificial layer of silicon underlying the micromechanical structure to release the micromechanical structure for movement (col.8 lines 7-15 and lines 26-48).

-Re. claims 3 & 7: wherein the system including forming isolation trench 18 through the device layer 48 (fig. 2)

-Re. Claim 6: wherein silicon of the device layer is comprises single crystal silicon layer 52 (col.5 lines 42-46).

-Re. claim 16: wherein the wafer is a bonding of a SOI to a handle wafer of silicon to create the substrate, which included from the layer 48 comprises of silicon, layer 46 of silicon oxide and layer 44 of silicon (col.5 layer 21-30).

-Re. claim 21: wherein etching a silicon sacrificial layer 46 disposed between the micromechanical structure and silicon handle layer 44 (fig.2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19, 20 & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brosnihan et al. (US. 6,121, 552) in view of Clark et al. (US. 6,433,401B1).

Brosnihan et al. also do not disclose the micromechanical structure is any of a micro-optical, an inertial sensor, or an actuator.

-Re. claims 19, 20 & 22: Clark et al. also referred wherein the micromechanical structure can be useful applying of a microsensors and microactuators include optical mirror for the interconnection (col.1 lines 23-34, col. 12 lines 18-23 and col. 15 lines 48-54).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Clark et al.'s applying of a microsensors and microactuators include optical mirror, into the method of Brosnihan et al.'s, to increase the track density or visible light to the wafer.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brosnihan et al. (US. 6,121, 552) in view of Greiff (US. 5,725,729).

Brosnihan et al. disclose substantially all of the claimed features, but do not disclose wherein the sacrificial layer is single crystal silicon.

-Re. claim 2: Greiff discloses a process for micromechanical fabrication, which includes wherein the sacrificial layer is single crystal silicon (col.4 lines 40-43 and col. 15 lines 65-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Greiff 's single crystal silicon sacrificial layer, into the method of Brosnihan et al.'s, to obtain a uniformly epitaxially grown structure for the device.

Allowable Subject Matter

Claims 4,5,8-15, 17 & 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: Prior art does not wherein the sacrificial layer is separated from the device by a second dielectric layer, in addition with the other limitations (cl. 4); wherein the release etch holes through the photoresist layer and the second dielectric layer (cl.8); wherein the first and second dielectric layer is used as an etch stop for the etching of the sacrificial layer (cls.9 & 10); wherein the isolation trench is used as a etch stop for the etching of the sacrificial layer (cl.11); wherein the handle layer has actuation electrodes formed thereon (cl.12); forming via posts extending through at least the sacrificial layer to contact the actuation

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electrodes (cl.13); wherein the via posts additionally extend through the device layer (cl.14); wherein the actuation electrodes are formed on the bottom of the sacrificial layer (cl.15); wherein the bonding a first SOI wafer to a handler wafer of silicon and removing the handle layer of the first SOI wafer to create the sacrificial layer, and bonding a second SOI wafer to the sacrificial layer and removing a handle layer of the second SOI wafer to create the device layer (cl.17); bonding a first wafer of silicon to a second wafer of silicon and bonding a third wafer of silicon to the first wafer of silicon and wherein the substrate is created (cl.18)

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B. Huynh whose telephone number is 571-272-1692. The examiner can normally be reached on M-F 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached 571-272-1702. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

YNBH,
072505



MICHAEL LEBENTRITT
SUPERVISORY PATENT EXAMINER